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RESEARCH ABSTRACT FORM

TITLE: Heat Topology Analysis of a Scalable Parallel Algorithm for Simulating the Control of Steady State Heat Flow through a Metal Sheet

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The objective of this research project is to determine the heat topologies of a scalable parallel algorithm that simulates the control of steady-state heat flow through a metal sheet. The algorithm simulates a square metal sheet with the initial conditions of heat of 100° applied to some edges and an ice bath of 0° applied to the other edges. The program performs these simulations using a parallel row-wise decomposition method with grid sizes of 100×100 , 200×200 and 400×400 for the sheet. Various numbers of compute nodes were used to determine speed-up and scalability of the algorithm. The algorithm tracked the temperature of the middle cell of the sheet under changing heat settings of the edges and displayed the heat topologies using MATLAB surface plots.